

UNITARY CHEMICAL PROCESSING DEVICE

ABSTRACT OF THE DISCLOSURE

A sample-processing device [150] comprises a unitary body [152], preferably a molded 5 polymeric part, having formed therein a reaction chamber [154] for chemically reacting a sample, a separation region [158] for separating components of the sample, and a transition region [156] connecting the reaction chamber [154] to the separation region [158]. The reaction chamber [154], transition region [156], and separation region [158] are formed in and enclosed by the unitary body [152]. Additionally, the transition region 10 [156] includes at least one flow restrictor [180] for controlling the flow of fluid between the reaction chamber [154] and the separation region [158]. Further, the portion of the unitary body [152] defining the transition region [156] has lower thermal conduction than the portion of the body defining the reaction chamber [154] so that the transition region [156] thermally isolates the reaction chamber [154] from the separation region [158]. In a 15 preferred embodiment, the reaction chamber [154] is an amplification chamber for amplifying nucleic acid in the sample, and the separation region [158] comprises an electrophoresis column or capillary containing a suitable matrix material, such as electrophoresis gel or buffer, for separating nucleic acid fragments in the sample. Electrodes [167, 168, 169] are embedded in the body [152] for forcing the sample 20 to flow from the reaction chamber [154] to the separation region [158]. The unitary body [152] may also be surrounded by external functional components such as an optical detector [186] for detecting separated components of the sample.